

Measure 3: Transit Ridership and Bus Volumes

Monitoring Objectives

The purpose of monitoring transit passenger and bus volumes was as follows:

- Provide data on bus volumes by street segment in downtown Seattle
- Measure the average weekday PM peak hour and weekday passenger loads crossing the Seattle CBD north-south screen line
- Provide data as available from Community Transit and Pierce Transit on average ridership crossing the north-south screen line during average PM peak hours and weekdays
- Identify and analyze any substantive changes in ridership or bus volumes for before and after tunnel closure conditions

Methodology

Baseline bus volumes used for this analysis were extracted from HASTUS - the King County Metro scheduling system - using the February 2005 service change. These counts included in-service as well as out of service coaches. A projection of bus volumes on downtown streets for after tunnel closure conditions for September 2006 was also issued with Volume 1, the Baseline Report. These projected bus volumes have subsequently been compared with actual bus volumes for all service changes that have occurred since tunnel closure. Volume 2 provided a comparison with bus volumes as of December 2005 that reflected routing adjustments made to address operating impacts on Stewart Street. Volume 3 provided a comparison with bus volumes from the February 2006 service changes. Volume 4 provided a comparison with bus volumes as of June 2006. Volume 5 provided a comparison with bus volumes as of the September 2006. With Volume 6, the comparison was with bus volumes from the February 2007 service change. For Volume 7, the relevant comparison is bus volumes on downtown streets before tunnel closure and after tunnel re-opening. Re-opening of the tunnel was accompanied not only by the re-assignment of routes back to the tunnel bus also the reassignment of routes on the surface streets to fully utilize the capacity of the Third Avenue made possible by the continuation of peak hour traffic restrictions.

For passenger loads, the Automated Passenger Count (APC) system is the primary source for passenger data for Metro coaches. APC data is collected in a random sample during each signup, downloaded and processed monthly. This data is summarized in a final form at the end of each signup. Preliminary data, based on smaller samples, is available monthly. Metro driver count data is collected on an ad hoc basis when preliminary APC results indicate that observations of trips on a particular route will fall below an adequate sample. Ridership data on Community Transit and Pierce Transit service is generated by the monitor reports supplied by each of these agencies. The ridership data from Community Transit and Pierce Transit is available by signup at the aggregate level.

APC data, supplemented by driver counts and estimates for any non-APC observed trips, was used to estimate pre-tunnel closure Metro ridership volumes crossing the screen line just south of University Street by trip during the PM peak hour and the average weekday. These results were been summarized by street and by direction and have subsequently been used to assess changes in ridership volumes and loads since tunnel closure.

Bus Volumes

Bus volumes before tunnel closure as of February 2004 are shown in Figure 9A. Average bus volumes during tunnel closure are shown in Figure 9B. The actual post tunnel bus volumes for downtown streets as of February 2008 service change are shown in Figure 9C. Peak hour tunnel utilization is slightly reduced from the period before tunnel closure but overall all day utilization is approximately the same due to the assignment of more all day routes to the tunnel. The utilization of Third Avenue has been maintained at or close to the levels achieved during tunnel closure by reassigning routes that formerly operated on First, Second, Fourth, and Fifth Avenues to Third Avenue. These shifts have resulted in a significant reduction in bus volumes on Second, Fourth, and Fifth Avenues.

Figure 9A. PM Peak Hour Transit Volumes, February 2004 - Pre-Tunnel Closure Baseline Report

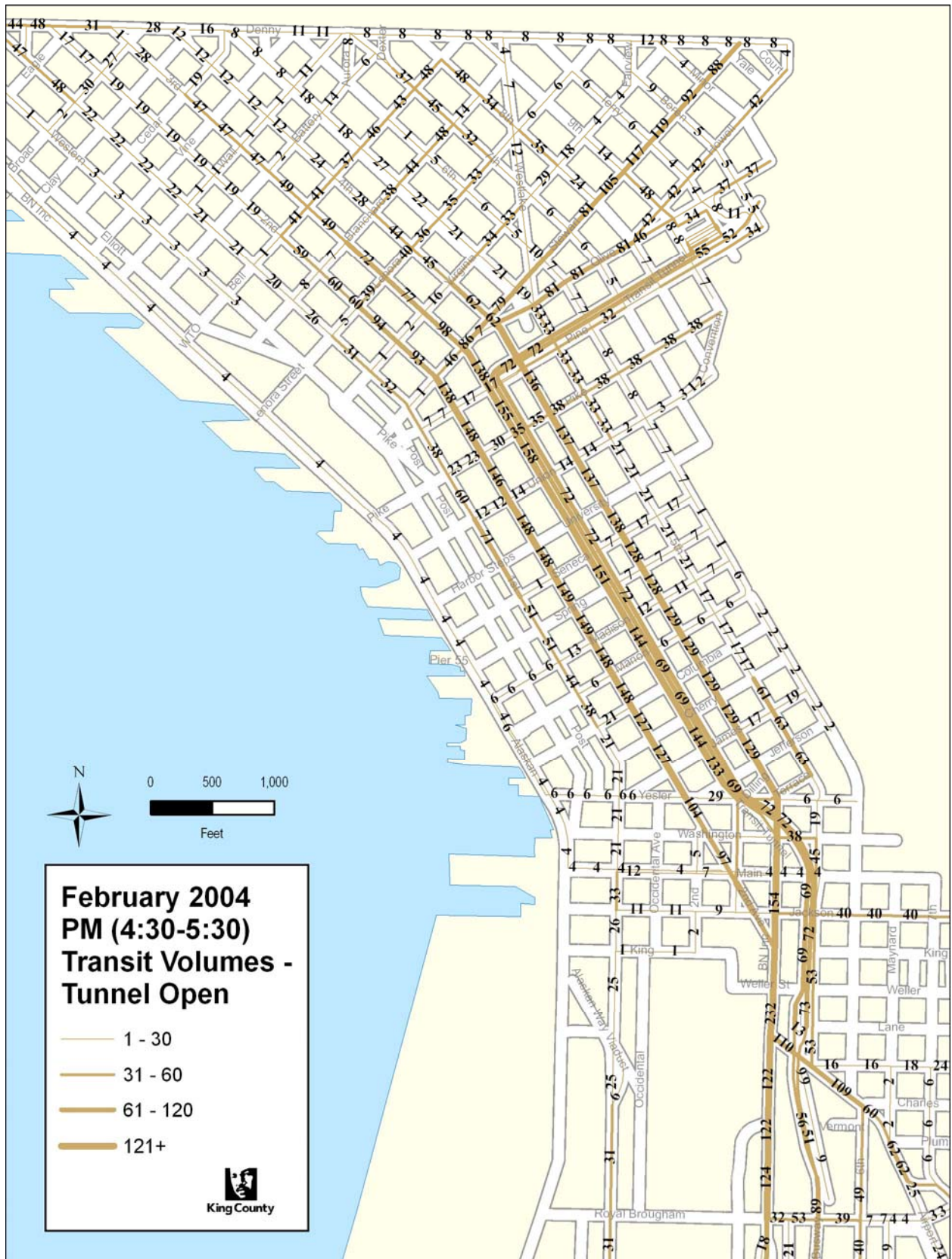
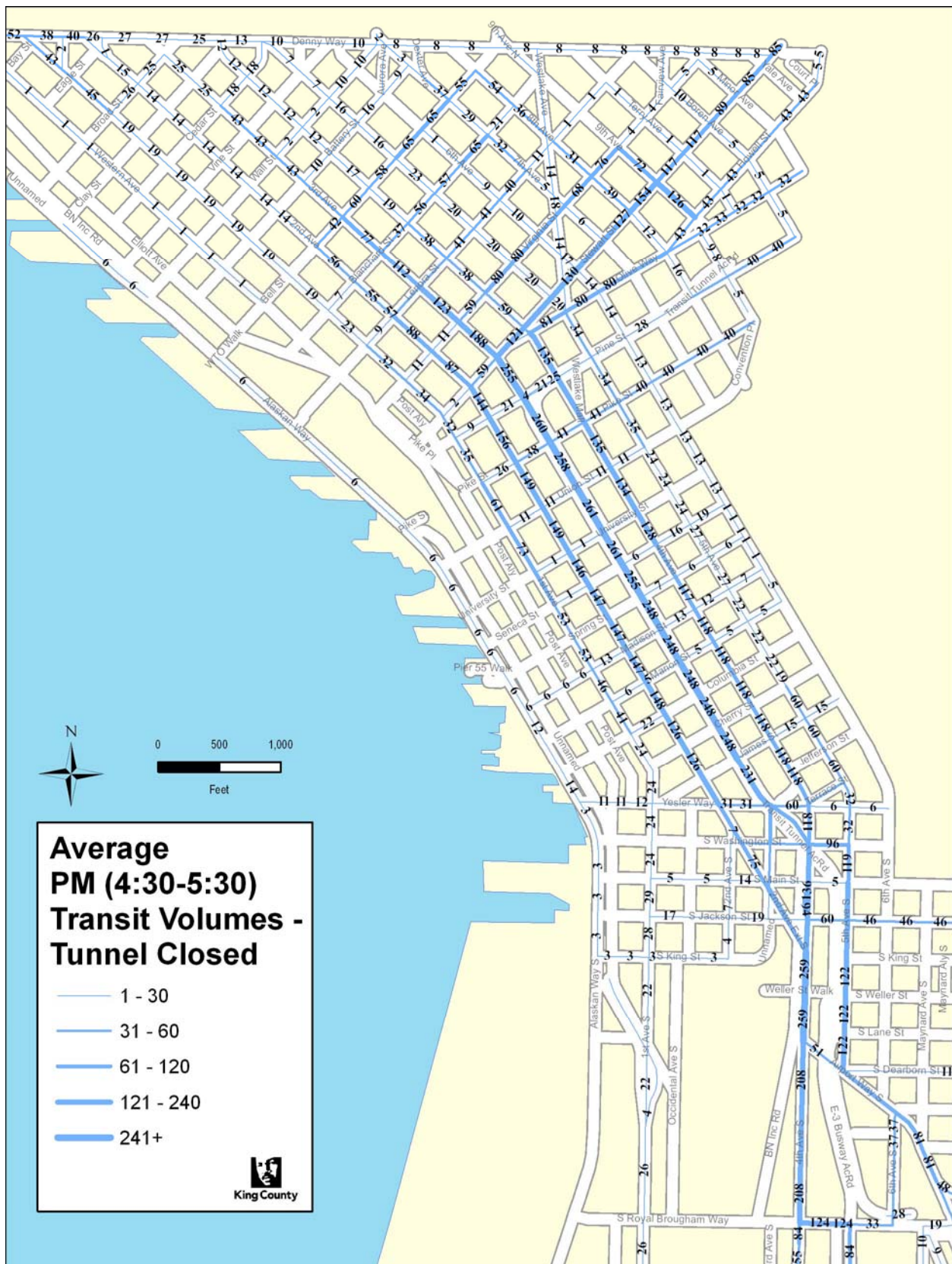


Figure 9B. Average PM Peak Hour Transit Volumes during Tunnel Closure



Current PM (4:30-5:30) Transit Volumes - Tunnel Open

- 1 - 30
- 31 - 60
- 61 - 120
- 121 - 240
- 241+

King County

January 2008

Transit Ridership Volumes

Prior to tunnel closure, the primary concern regarding ridership was that ridership on transit trips entering the CBD might exceed the available capacity, leading to unacceptable overloads. To address this concern, University Street, approximately in the middle of the CBD, was established as a screenline, and the total volume of riders crossing this screenline, regardless of origin or destination, was measured for pre-closure baseline conditions, and for post-closure conditions. It has also been measured for tunnel re-opening conditions in 2007.

Approximately 95,000 north-south riders crossed the downtown screenline at University Street on weekdays in fall 2004 before tunnel closure. As part of a general increase in ridership, this number increased to almost 106,700 weekday riders in spring 2005. Ridership in spring 2007, just before tunnel re-opening was almost three percent higher than spring 2005, at 109,400 weekday riders. Preliminary data for fall 2007 suggest that loads crossing University Street after tunnel re-opening rose to over 115,000 weekday riders as of October and November. This increase was expected, since tunnel re-opening meant travel times across the CBD have decreased, encouraging more ride free area trips.

Figure 10 compares fall 2007 ridership on King County Metro routes at University Street with loads at University Street in spring 2005, before tunnel closure, and loads at University Street in spring 2007, before tunnel re-opening. Average weekday loads increased by approximately 5 percent after tunnel re-opening, and were 8 percent higher than in spring 2005. Loads crossing the screenline in just the tunnel in both directions increased by about 5 percent. The total load crossing the screenline during the peak hour from 4:30 to 5:30 PM increased by about 22 percent after tunnel re-opening, when compared to spring 2007, bearing out predictions of a latent demand for cross-CBD trips that had been suppressed by tunnel closure.

Since tunnel re-opening was accompanied by the reassignment of additional routes to Third Avenue, as well as the assignment of routes into the tunnel, all of the avenues except Third saw significant decreases in the Amount of load crossing the screenline.

Figure 10. Passenger Loads at University Street, before Tunnel Closure (spring 2005), during Tunnel Closure (spring 2007), and after Tunnel Re-opening (fall 2007)

| | | Weekday Riders | | | Change since | | 1-Hr PM Peak Riders | | | Change since | |
|-------|-----|----------------|-------------|-----------|--------------|-------------|---------------------|-------------|-----------|--------------|-------------|
| Ave | Dir | Spring 2005 | Spring 2007 | Fall 2007 | Spring 2005 | Spring 2007 | Spring2005 | Spring 2007 | Fall 2007 | Spring 2005 | Spring 2007 |
| 1st | N | 9,861 | 10,708 | 5,909 | -40% | -45% | 757 | 812 | 674 | -11% | -17% |
| | S | 6,002 | 5,892 | 4,291 | -29% | -27% | 469 | 691 | 406 | -13% | -41% |
| 2nd | S | 14,794 | 15,859 | 9,460 | -36% | -40% | 2,465 | 1,999 | 1,767 | -28% | -12% |
| 3rd | N | 17,849 | 29,273 | 28,276 | +58% | -3% | 1,478 | 2,824 | 2,500 | +69% | -11% |
| | S | 17,239 | 26,056 | 27,097 | +57% | +4% | 1,883 | 3,431 | 3,675 | +95% | +7% |
| 4th | N | 10,375 | 16,894 | 9,257 | -11% | -45% | 825 | 950 | 637 | -23% | -33% |
| 5th | S | 3,046 | 4,730 | 1,812 | -41% | -62% | 155 | 267 | 49 | -68% | -82% |
| Tnl | N | 12,991 | N.A. | 14,189 | +9% | N.A. | 1,188 | N.A. | 1,521 | +28% | N.A. |
| | S | 14,495 | N.A. | 14,793 | +2% | N.A. | 1,959 | N.A. | 2,147 | +10% | N.A. |
| Total | | 106,651 | 109,411 | 115,084 | +8% | +5% | 11,179 | 10,974 | 13,376 | +20% | +22% |

Figure 11 compares fall 2007 data for standing loads on routes operated by King County Metro at University Street with standing loads before tunnel closure and before tunnel re-opening. The overall incidence of standing loads rose substantially after tunnel re-opening, particularly on First Avenue northbound, possibly indicating that these loads were due to fewer buses being available on First Avenue to serve the trips on First Avenue that are internal to the central business district.

In addition, standing loads in the tunnel southbound are at fairly high levels during the peak one hour. Since this analysis is based on preliminary fall data and a relatively small sample size, these figures may represent sampling error, as well as the fact that ridership is seasonally higher in the months of October and November than it is later in the fall signup.

Figure 11. Loads over Seating Capacity at University Street, before and during Tunnel Closure and after Tunnel Re-opening

| Av | Dir | Average Loads Greater than Seat Capacity | | | | | | Average Loads 20% over Seating Capacity | | | | | |
|-----------------|-----|--|------|------|----------------------|------|-------|---|------|------|----------------------|------|------|
| | | % of Weekday Trips | | | % of Peak 1-Hr Trips | | | % of Weekday Trips | | | % of Peak 1-Hr Trips | | |
| | | Sp05 | Sp07 | Fa07 | Sp05 | Sp07 | Fa07 | Sp05 | Sp07 | Fa07 | Sp05 | Sp07 | Fa07 |
| 1 st | N | 1.8% | 1.5% | 3.5% | 7.5% | 8.1% | 15.3% | 0.0% | 0.4% | 0.7% | 0.0% | 2.7% | 7.7% |
| | S | 1.3% | 0.0% | 1.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| 2 nd | S | 0.3% | 0.5% | 0.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% |
| 3 rd | N | 1.2% | 1.2% | 3.8% | 1.5% | 0.0% | 3.9% | 0.2% | 0.2% | 1.0% | 0.0% | 0.0% | 1.0% |
| | S | 5.0% | 1.6% | 3.0% | 4.7% | 2.8% | 5.0% | 1.3% | 0.1% | 0.9% | 1.6% | 0.0% | 0.8% |
| 4 th | N | 0.5% | 0.1% | 0.9% | 0.0% | 0.0% | 0.0% | 0.3% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% |
| 5 th | S | 0.8% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.8% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Tnl | N | 0.4% | N.A. | 1.1% | 0.0% | N.A. | 0.0% | 0.0% | N.A. | 0.0% | 0.0% | N.A. | 0.0% |
| | S | 0.2% | N.A. | 1.3% | 0.0% | N.A. | 5.5% | 0.0% | N.A. | 0.0% | 0.0% | N.A. | 0.0% |
| Total | | 1.3% | 0.9% | 2.3% | 1.4% | 1.4% | 3.5% | 0.3% | 0.1% | 0.5% | 0.2% | 0.2% | 0.8% |

Ridership crossing the University Street screenline in fall 2007 has risen well above levels seen before tunnel closure or during tunnel closure. Data from screenlines at the edges of the CBD indicate that loads leaving the CBD have also increased substantially since spring 2005, from 90,800 to over 110,000 riders each weekday, including loads on Community Transit and Pierce Transit-operated services. Similarly, loads entering the CBD increased from about 88,000 in spring 2005 to over 100,000 in fall 2007.

Standing loads on routes operated by King County Metro have also increased since spring 2007, although they are still a small fraction of outbound trips. Figure 12 compares the percent of trips with standing loads leaving downtown at various times of the day. The largest increase, not surprisingly, is in the PM peak, when 11.5 percent of trips leaving the Seattle CBD had standing loads, as compared to 3.4 percent of trips in spring 2005. This increase was spread across a number of routes, including ones not likely to be directly affected by tunnel closure or re-opening. This increase in overloads can probably be attributed to the general rise in ridership over the past three years.

Figure 12. Percent of trips leaving CBD Averaging Standing Loads, before, during, and after Tunnel Closure and Re-opening.

| | | AM Peak | Midday | PM Peak | Evening | Total |
|----------------|-------------|---------|----------|---------|---------|-------|
| | | 6-9 AM | 9AM-3 PM | 3-7 PM | 7-11 PM | |
| Standing Loads | Spring 2005 | 2.4% | 2.7% | 3.4% | 0.3% | 2.4% |
| | Spring 2007 | 3.3% | 2.5% | 5.3% | 1.2% | 3.6% |
| | Fall 2007 | 5.1% | 6.4% | 11.5% | 1.7% | 7.1% |
| Over 120% Load | Spring 2005 | 0.0% | 0.7% | 0.5% | 0.0% | 0.4% |
| | Spring 2007 | 0.6% | 0.4% | 1.2% | 0.0% | 0.7% |
| | Fall 2007 | 2.4% | 2.4% | 3.4% | 0.0% | 2.3% |